REMARKS

In view of the above amendments and the following remarks, reconsideration of the rejections and further examination are requested. Upon entry of this amendment, the specification is amended, the abstract is amended, claims 1 and 7 are amended, and claim 4 is cancelled, leaving claims 1-3 and 5-20 pending with claims 1 and 7 being independent. No new matter has been added.

Specification

The specification and abstract have been carefully reviewed and revised to correct grammatical and idiomatic errors in order to aid the Examiner in further consideration of the application. No new matter has been added.

Rejections Under 35 U.S.C. §103(a)

Claims 1-20 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Takehana et al. (U.S. 6,851,859) in view of Mori et al. (U.S. 5,704,718).

Applicants submit that the claims as now pending are allowable over the cited prior art. Specifically, amended independent claim 1 recites a hydrodynamic bearing device comprising a shaft member having a flat face at an apex thereof and a guide face serving as a guide when another member is press fitted into the shaft member, the outer circumferential surface of the shaft member being a ground surface and being adjacent the guide face, a blunting portion being formed between the guide face and the outer circumferential surface of the shaft member adjacent to the guide face, the blunting portion being a curved surface that is smoothly continuous from the guide face to the outer circumferential surface, and an edge does not result from grinding between the guide face and the outer circumferential surface of the shaft member.

A conventional hydrodynamic bearing device used for a spindle motor for information equipment generally provides a guide face for serving as a guide when a hub is press-fitted into the shaft member at an end portion of a shaft member. Because the guide face does not generally have direct impact on the precision of the bearing surface, it is an excepted practice to grind an outer circumferential surface alone with the guide face left unground. In addition, in the conventional method where the outer circumferential surface alone is ground, an edge is generated at a boundary portion between the outer circumferential surface and the guide face. In

the present invention, as recited in claim 1, the edge acts as an adverse resistance when the hub is securely press-fitted into the shaft end, inducing galling and then resulting in inclination of the press-fitted hub for the first time in this field. *See* line 23, page 3 to the last line of page 4 of the present specification.

Generally, the inclination of the hub is not an issue in mechanical parts; however, such a minor tilt may significantly affect the information processing accuracy in any hydrodynamic bearing device used for a spindle motor for information equipment, such as HDDs. Thus, the generation of such an edge and the tilt of the hub thereby caused is a problem unique to a hydrodynamic bearing device used for a spindle motor for information equipment.

To solve this problem, the invention of the present application, as recited in claim 1, is advantageous in that the blunting portion is formed in a curved line from the guide face to the outer circumferential surface of the shaft member adjacent thereto, so that smooth continuity is provided between these two portions to deter the edge that is conventionally generated when the outer circumferential surface of the shaft member is ground. Thus, the structure of the present invention, as recited in claim 1, overcomes the problem of the conventional devices that an edge is generated when the outer circumferential surface of the shaft member is ground. As a result, the push-in resistance that impacts on the hub can be alleviated, and such an unwanted event that the hub is attached with an inclination is accordingly prevented.

The present invention further includes the structure of a flat face that is disposed at the apex of the shaft member. The flat face is used to determine the axial position of the disc hub when another member, e.g., the disc hub, is press-fitted into the shaft member, or to enable a face to contact with a member for constraining the shaft member from both sides thereof in the axial direction to securely support the shaft member when the outer circumferential surface of the shaft member is ground.

The cited prior art fails to disclose or render obvious such a device. In particular, the Examiner recognizes that Mori (should be Takehana) fails to disclose a blunting portion formed between the guide surface and the outer circumference and the shaft member adjacent to the guide face, the blunting portion having a shape in which an edge is blunted. For this element, the Examiner relies on Takehana (should be Mori, since Mori shows a shaft member in Fig. 9)

However, Applicants submit that there is no disclosure in Mori (or Takehana) that the outer circumferential surface of the shaft member is a ground surface. Additionally, even

assuming *arguendo* that the outer circumferential surface is ground, an edge caused by grinding is still formed at the boundary portion between the outer circumferential surface of the shaft member and the spherical surface at the shaft end. Therefore, even if the suggested combination was appropriate, it would not have prevented the formation of the edge caused by grinding at the boundary portion between the outer circumferential surface of the shaft member and the spherical surface at the shaft end, even after modifying the upper end portion of the shaft member disclosed in Takehana with the shape disclosed in Mori. Thus, the structures disclosed by Takehana and Mori are significantly distinct from the structure recited in claim 1 of the present invention, which prevents the formation of the edge.

Furthermore, the overall shape of the shaft end disclosed in Mori is a spherical surface. In other words, there is no flat surface, as recited in claim 1 of the present invention. Therefore, modifying Takehana with the Mori shaft end fails to render obvious the shaft member, as recited in claim 1 of the present invention. Moreover, the structure disclosed in the prior art, i.e., the lack of a flat surface provided on the shaft member, is not capable of determining the axial position of the disc hub when the disc hub is press-fitted into the shaft member. Another disadvantage of the prior art structure is difficulty in grinding the outer circumferential surface of the shaft member with precision, because both ends of the shaft member cannot be securely supported during the grinding. Such a disadvantage is overcome by the structure of the present invention as recited in claim 1.

For at least these reasons, Applicants submit that the cited prior art fails to disclose each of the elements of independent claim 1. Moreover, there is no reasoning in the prior art to modify Takehana or Mori such that the combination thereof would have rendered claim 1 obvious. Therefore, Applicants submit that independent claim 1 and its dependent claims are allowable over the cited prior art.

Applicants submit that independent claim 7 is allowable for similar reasons. Namely, the cited prior art fails to disclose or render obvious a method for manufacturing a hydrodynamic bearing device comprising forming, on a shaft member, a flat face at an apex thereof and a guide face serving as a guide when another member is press fitted into the shaft member, and thereafter simultaneously grinding the guide face, the outer circumferential surface of the shaft member adjacent to the guide face, and a boundary portion between the guide face and the outer circumferential surface of the shaft member adjacent to the guide face so that a blunting portion

is formed at the boundary portion in the shape of a curved surface that is smoothly continuous from the guide face to the outer circumferential surface, wherein the boundary portion has no edge resulting from grinding.

Conclusion

In view of the foregoing amendments and remarks, all of the claims now pending in this application are believed to be in condition for allowance. Reconsideration and favorable action are respectfully solicited.

Should the Examiner believe there are any remaining issues that must be resolved before this application can be allowed, it is respectfully requested that the Examiner contact the undersigned by telephone in order to resolve such issues.

Respectfully submitted,

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